February 2002

North Sea

The North Sea holds Europe's largest oil and natural gas reserves and is one of the world's key non-OPEC producing regions. Norway and the United Kingdom hold the majority of the North Sea's reserves and production. Denmark, the Netherlands, and Germany have smaller North Sea oil and gas holdings.

Information contained in this report is the best available as of February 2002 and is subject to change.

GENERAL BACKGROUND

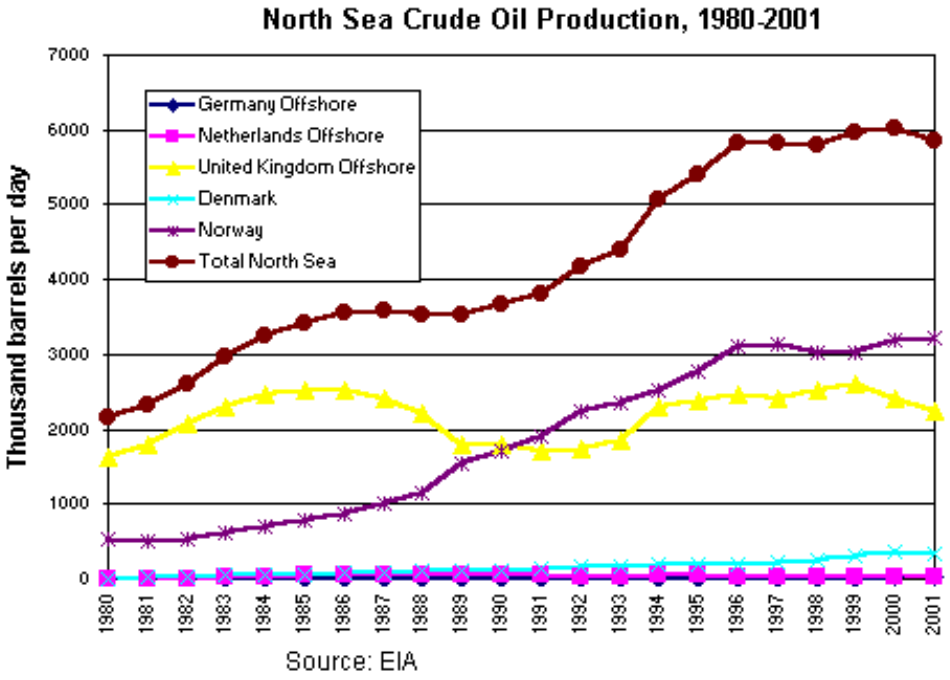
North Sea oil and natural gas were first discovered in the 1960s. The North Sea did not emerge immediately as a key non-OPEC oil producing area, but output grew as major discoveries continued throughout the 1980s and into the 1990s. Production in the inhospitable climate -- cold, windy, and at great depths -- relies on sophisticated offshore technology. Consequently, the region is a relatively high cost producer, but its political stability and proximity to major European consumer markets have allowed it to play a major role in world oil and gas markets.

A key feature of North Sea oil is its role as one of the major "benchmark" crude oils, important for oil pricing. (Brent crude is a blend of North Sea crude oils and does not come exclusively from the Brent field.) Because Brent crude is traded on the International Petroleum Exchange in London, fluctuations in the market are reflected in the price of Brent. Therefore, the many other crude oils linked to Brent can be priced according to the latest market conditions. Brent crude production is forecast to fall precipitously from its current 400,000 barrels per day (bbl/d) by 2005. A study on the possibility of linking the Statfjord system with the Brent system was shelved by Statfjord operator Statoil in January 2002. The increased throughput would have

supported trade in the increasingly dated Brent price marker, extending its life as a price marker and reducing volatility in the 15-day Brent forward market, where liquidity has fallen to under 25 cargoes per delivery month compared with 300-400 deals per month in the early 1990s.

North Sea oil and natural gas production reached new heights in 2000, with oil production exceeding 6 million barrels per day (bbl/d) for the first time. But, production declined slightly in 2001, to about 5.9 million bbl/d. Analysts predict that oil production will rise again in 2002 as rising output from a number of fields that came on line in 2001 will make up for declining production in mature fields, though the length and effectiveness of Norwegian production cuts may mitigate an overall rise in oil production. The declines in mature fields are predicted to outweigh the gains from newer, smaller fields from 2003 onwards, indicating a long-run decline in North Sea production. Low oil prices, or extreme price volatility generally have negative implications for North Sea oil and natural gas exploration because of the region's high production costs.

OIL



Norway and the United Kingdom are the largest producers of North Sea oil by a wide margin. British production fields are more mature than Norwegian fields, and production has begun to decline in recent years. Norway's North Sea production is characterized by fewer, larger fields, and Britain's by numerous smaller fields. North Sea crude oil tends to be light and sweet, with gravities in the 35º-50º API range. Norway's Oseberg and Sleipner fields produce ultra-light crude with gravities of 68º API and 57.5º API respectively. Because of the North Sea crude's light, sweet quality, the UK's total exports tend to be higher than its net exports as the UK imports heavier, sour crude that its refineries are able to utilize efficiently.

Norway has been the world's third-largest oil exporter for several years. With a population of 4.5 million, the country produced about 5% of the world's oil and 7% of non-OPEC (Organization of Petroleum Exporting Countries) oil in 2001, at an estimated 3.2 million bbl/d of crude oil. In recent years, the country has been in the top ten world oil producers, while its consumption is ranked about 50th in the world. Underlying its importance in world markets, Norway sometimes alters its production in coordination with OPEC production increases or decreases. For instance, Norway agreed to reduce its oil output by 150,000 bbl/d, cutting the government's expected production from 3.17 million bbl/d to 3.02 million bbl/d, as of January 1, 2002, as part of a plan by OPEC and major non-OPEC producers to bolster oil prices in the face of weak world oil demand. The cuts are expected to last six months.

Norway's Jotun field experienced a decline of about 72,000 bbl/d in 2001, while Troll experienced an increase of about 67,000 bbl/d, and seven smaller fields that started up in 2001 added about 130,000 bbl/d to Norway's output. In October and November 2001, Norsk Hydro made two promising discoveries in the Oseberg area that will be able to make use of existing infrastructure. Estimates of the discoveries' reserves are 120 million barrels of oil and 120 billion cubic feet (Bcf) of natural gas. Total added oil reserves to the Norwegian North Sea in 2001 were about 200-250 million barrels, only about 20% of total production in

2001.

The United Kingdom is the European Union's (EU's) only significant energy exporter. Unlike non-EU member Norway, the UK also has some on-shore production and is one of the world's largest oil consumers, ranking in the top 15. UK net oil exports were about one quarter of Norway's exports in 2001, at about 890,000 bbl/d. Waters in the central North Sea off the east coast of Scotland contain nearly half of the UK's remaining oil reserves, with about a quarter of reserves located in the northern North Sea off of the Shetland Islands. Because of the UK oil sector's maturity, exploration in recent years has focussed primarily on smaller fields and on incremental development of existing fields. The UK's PILOT program, a government-industry partnership of the British Oil and Gas Industry Task Force, focuses on developing and overseeing recommendations on how to best develop the UK's soon-to-be declining production. British Energy Minister Brian Wilson has urged that larger companies that are unwilling to develop smaller fields in the British North Sea transfer them to smaller, independent operators for which the fields would be more economically viable. A study commissioned by PILOT and released in December 2001 by Aberdeen University in Scotland claims that oil companies operating in the UK's 200 or so North Sea wells could increase production by up to 50% through better coordination and cooperation.

After several years of declining production, the UK's North Sea production is expected to rise very slightly or remain flat in 2002. Eleven new (2001 or 2002 start-up) fields will add about 145,000 bbl/d to the UK's production capacity. This added capacity includes increased production from TotalFinaElf's new Elgin/Franklin system of 79,000 bbl/d (mostly condensate) as well as about 50,000 bbl/d from Royal Dutch/Shell's Shearwater field (oil and natural gas). Shearwater had technical problems and was shut down after first coming on-stream in September 2000 and is expected to be restarted this month. Annual depletion rates above 15% for fields such as Brent, Forties, Ninian, and Beryl indicate an overall output decline as early as 2003. However, in January 2002, new oil reserves were found at the Buzzard field that are the largest find in over a decade. The field is expected to yield 400 million barrels, far in excess of initial estimates of 100-200 million barrels.

Denmark, the Netherlands, and Germany are smaller North Sea oil producers. Only Denmark is a net oil exporter, with an estimated 132,000 bbl/d of net exports in 2001. Denmark's production is estimated to have reached a record high in December 2001, exceeding 400,000 bbl/d for the first time, though for the year, production was lower due in part to an accident at the Gorm field. The Netherlands and Germany are both net importers. The new Hanze field in the Dutch North Sea that came online in August 2001 is now producing about 31,500 bbl/d, dramatically increasing the small Dutch production output for 2002.

Although the UK has the North Sea's highest number of producing fields, the largest North Sea producing fields are located in Norway. Total North Sea production reached a new peak of just over 6 million bbl/d in 2000. The 1980s and early 1990s showed steady growth in North Sea output, which stagnated and dropped slightly in the late 1990s. The 1997-1998 oil price collapse had negative effects on North Sea production, but stronger prices saw production rise by about 200,000 bbl/d 1998-2000 before declining by about 100,000 bbl/d in 2001.

Major North Sea Oil Production Fields*

Country	Field	Est. 2000 Production	Operator

Norway, 85.5%; UK, 14.5%	Statfjord	340,060	Statoil
Norway	Troll (I & II)	320,012	Norsk Hydro
Norway	Ekofisk	287,815	Phillips
Norway	Gullfaks	280,503	Statoil
Norway	Draugen	202,377	Shell
Norway	Heidrun	180,236	Statoil
Norway	Norne	179,567	Statoil
Norway	Oseberg	176,179	Norsk Hydro
Norway	Snorre	147,807	Norsk Hydro
Norway	Asgard	141,882	Statoil
Norway	Sleipner	138,386	Statoil
Norway	Jotun	123,470	ExxonMobil
UK	Schiehallion	120,711	BP
Denmark	Dan	113,464	Maersk Oil

**Source:* Oil and Gas Journal*; includes all fields with more than 90,000 bbl/d of oil production in 2000.*

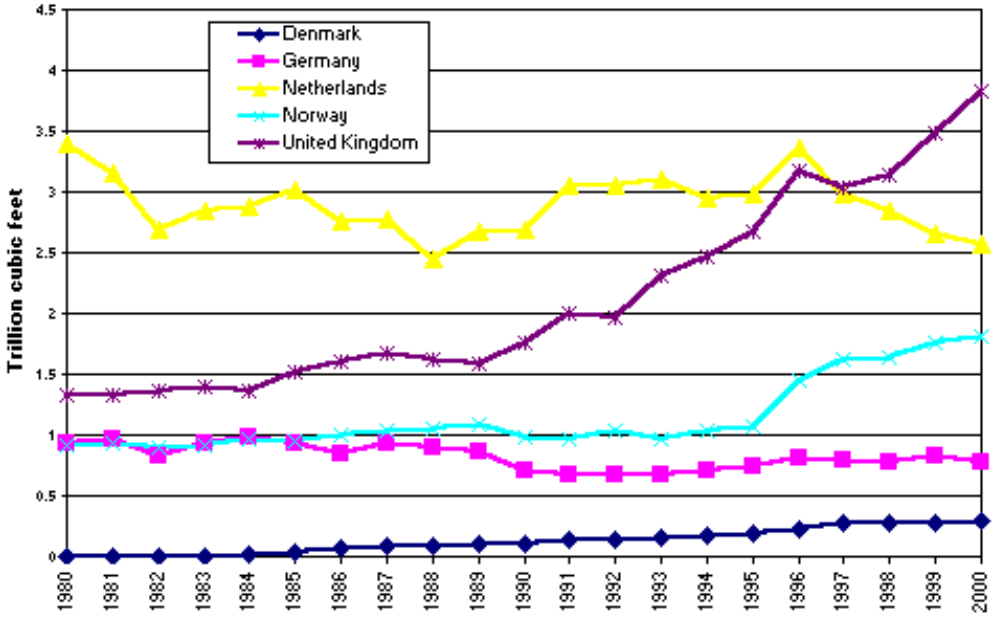
Note: Some "fields" actually are systems including multiple adjacent fields. Jotun is now operated by Statoil.

Oil Infrastructure

Ekofisk was the first North Sea oil field to be discovered in the late 1960s, and developed, with production beginning in 1971. Since 1975, oil has been piped through the Norpipe pipeline from Ekofisk to the UK (Teesside, England). Currently, additional pipeline connections to the UK include a major pipeline from the Nelson/Forties field area to Cruden Bay, north of Aberdeen. There is one pipeline connecting northern North Sea production to Scotland's Orkney Islands and two pipelines to the Shetland Islands.

Norway has two major pipeline connections. One runs from the Troll fields to Mongstad, and the other goes from the Oseberg area to Kollsnes. Denmark's Dan field connects to Kaergard. The Netherlands has two small pipelines connecting to Hoek van Holland and IJmuiden.

North Sea Countries' Natural Gas Production, 1980-2000*



*Please note that data are for each country's *total* natural gas production and are not limited to offshore North Sea production.

Source: EIA

NATURAL GAS

Unlike North Sea oil production, natural gas production remains on the rise. Energy demand in Europe is growing, and much of the growth is expected to be met with natural gas. North Sea natural gas has a geographical advantage over other world natural gas sources, as North Sea natural gas is closer and therefore less expensive to transport to major European markets. Most of continental Europe is already linked, directly or indirectly, to North Sea gas sources, and many EU energy companies have large, long-term contracts with major exporters the Netherlands and Norway. Important spot markets for natural gas have developed as well. In December, the UK natural gas market began trading on the Intercontinental Exchange (ICE), with the first day yielding 115 trades at the National Balancing Point (NBP) with volume of 205 million Btu. The UK's NBP is a "notional point" that is used as a delivery point for natural gas that is traded "entry paid" rather than at beach terminals. Zeebrugge is Europe's largest natural gas trading hub. It is in Belgium, with connections to Norway's Zeepipe and the UK-Belgium interconnector as well as the French and German consumer markets. The Bunde-Oude hub on the Dutch-German border is growing in importance. This is the point where the pipeline system of Gasunie of the Netherlands links up to the German networks of Ruhrgas, Wingas, and BEB. Analysts predict that increased liquidity at Bunde-Oude along with market liberalization will be an incentive for more suppliers to attempt to break into the market.

The Netherlands, along with Russia, for years has been one of the top gas suppliers for Western Europe. The Netherlands remains the EU's largest net gas exporter, although production is now in decline. The country has made a policy decision to cut back production at its large onshore Groningen field in order to maintain reserves for future use. Most of the declining production is due to this field's intentional decreased production. The Netherlands holds both on and offshore gas reserves, with significant portions of its production coming from onshore reserves.

The UK's natural gas production has grown in recent years, and the country now is a small net exporter. Though most of the UK's natural gas production is in the North Sea, there is a small amount of production onshore and several large fields producing in the Irish Sea. The largest number of non-associated gas fields are located off the English Coast in the Southern Gas Basin, adjacent to the Dutch North Sea sector. However, the three largest sources of natural gas are the Scottish Area Gas Evacuation (SAGE) system, the Central Area Transmission System (CATS), and the Far North Liquids and Associated Gases System (FLAGS), all of which are composed of fields in the central and nothern British Sector.

Norway has become a key European supplier, second after Russia, as holdings in the North Sea, Norwegian

Sea, and Barents Sea came onstream. By 2006, deliveries on long-term contracts are expected to reach 7 Bcf per day. It is estimated that natural gas production increased by about 7% in the first ten months of 2001 compared with the same period in 2000. However, reserve additions in 2001 are estimated to be less than half of current production rates. The Troll field contains over half of Norwegian gas reserves. Ekofisk and Frigg have been selling gas since the 1970s, while Statfjord, Gullfaks and Heimdal came onstream in the 1980s. Frigg has declined to the point that it is expected to be taken offline sometime this year or early next year. The Ormen Lange field, Norway's second-largest natural gas discovery with estimated reserves of 14.1 trillion cubic feet (Tcf), is expected to begin production in 2006. Statoil submitted a $1.9-billion plan for the development of the Kristin field to the government in August 2001, which was approved in January 2002. Sales agreements have already been reached for the field, and Statoil expects the field to be able to produce over 1.2 Tcf from 2005-2016.

Natural Gas Infrastructure

The already substantial North Sea natural gas infrastructure continues to grow. The Netherlands and the UK have the most extensive pipeline networks in place, while Norwegian export routes are expanding.

The UK has many pipeline connections to its prolific southern North Sea, bordering on the Dutch North Sea sector. The major receiving ports for these pipelines include Bacton, Theddlethorpe, and Easington, all located in the middle of England's North Sea coast. One pipeline also connects to Teesside, further north on the English coast. There are many connections from the northern North Sea to Scotland which come onshore at St. Fergus, just north of Aberdeen. The UK is a small gas exporter and has a pipeline connection to Zeebrugge, Belgium that can be reversed so that Britain is also able to import natural gas. There is also a connection to Ireland off the west coast of the UK.

The Netherlands has many gas pipelines connecting its mainland to its gas-rich sector of the southern North Sea. The biggest landing point for these pipelines is Den Helder. There are also pipeline connections from the Dutch North Sea to France and Belgium.

Norwegian gas arrives in Europe through the following trunklines: the Europipe I and Statpipe/Norpipe systems to Germany; the Zeepipe trunkline to Zeebrugge in Belgium; the NorFra line to Dunkerque in northern France; and the Europipe II line from Kårstø north of Stavanger to Emden in Germany. These Norwegian trunklines provide a combined gas transport capacity of 2.7 Tcf per year. Norway has several pipelines connecting to Kollsnes, the landing point for Troll gas. Additional pipelines connect Karsto. In 1998, the NorFra pipeline came onstream, linking Troll to the French natural gas grid, from which natural gas can transit to Spain and Italy. Statoil will begin laying new pipelines from its Kristin development into existing infrastructure this year. Norway signed an agreement with Poland in 1999 whereby Poland will import Norwegian gas from 2001 to 2006. A new pipeline connecting to Poland under the Baltic Sea will be built. The new Vesterled pipeline will allow Britain to import Norwegian natural gas by means of its connection between the declining Frigg field that is already connected to the UK and newer Norwegian gas fields connected to the Heimdale platform.

Germany and Denmark have fewer North Sea gas pipelines. Germany has connections to Norway's Ekofisk and Sleipner fields as noted above. Denmark has pipelines connecting its own gas fields to its port of Kaergard in Jutland.

	Proven Oil Reserves, 1/1/02	Total Oil Production, 2001	Net Oil Exports, 2001	Proven Natural Gas Reserves, 1/1/02	Total Natural Gas Production, 2000	Net Natural Gas Exports, 2000
Norway	9.4 billion barrels	3.4 million bbl/d	3.2 million bbl/d	44 Tcf	1.8 Tcf	1.7 Tcf

UK	4.9 billion barrels	2.6 million bbl/d	892,000 bbl/d	26 Tcf	3.8 Tcf	227 Bcf
Denmark	1.1 billion barrels	350,000 bbl/d	132,000 bbl/d	2.7 Tcf	289 Bcf	107 Bcf
Netherlands	107 million barrels	79,000 bbl/d	-804,000 bbl/d (net importer)	62.5 Tcf	2.6 Tcf	866 Bcf
Germany	364 million barrels	141,000 bbl/d	-2.7 million bbl/d (net importer)	12 Tcf	779 Bcf	-2.5 Tcf (net importer)

Sources for this report include: CIA World Factbook 2001; Economist Intelligence Unit ViewsWire; Financial Times; Oil and Gas Journal; Petroleum Economist; Petroleum Intelligence Weekly; U.S. Energy Information Administration; DRI/WEFA World Economic Outlook; World Markets Online; various company websites.

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File last modified: February 13, 2002

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